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In re Application of

Atty. Docket No.: 26068-08D

Anderson et al.

Serial No.: 09/891,064

Art Unit: 1644

Filed: June 25, 2001

Examiner: P. Nolan

Title: Human Occludin, Its Uses and Enhancement of Drug Absorption Using Occludin Inhibitors

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**DECLARATION OF DR. JAMES M. ANDERSON AND**  
**DR. CHRISTINA M. VAN ITALLIE**

1. I, JAMES M. ANDERSON, hereby declare as follows: I am currently Professor and Chair in the Department of Cell and Molecular Physiology, School of Medicine, University of North Carolina at Chapel Hill. I received my M.D. from Harvard Medical School (1983) and my Ph.D. from Harvard University (1979). Previously, I had been involved in research and teaching in Medicine, Physiology and Cell Biology at Yale University from 1988 to 2002 (14 years). I am a member of the American Society for Cell Biology, American Physiological Society, American Society for Clinical Investigation, American Society for Advancement of Science and a number of other societies set forth in my Curriculum Vitae (C.V.), a copy of

which is appended hereto as Exhibit A. I have authored or co-authored over 62 peer-reviewed publications in addition to invited review articles, book chapters and books. My service on various National Committees, committees at Yale University and Yale Medical School and UNC of Chapel Hill School of Medicine are summarized in the attached C.V.

2. I, CHRISTINA M. VAN ITALLIE, hereby declare as follows: I am currently Associate Professor of Medicine, School of Medicine, University of North Carolina at Chapel Hill. I received my Ph.D. from the Massachusetts Institute of Technology (1983). Previously, I had been involved in research in Medicine at Yale University from 1988 to 2002 (14 years). I have authored or co-authored over 29 peer-reviewed publications including invited review articles and book chapters as set forth in my Curriculum Vitae (C.V.), a copy of which is appended hereto as Exhibit B.

As co-inventors of the above-identified patent application, we hereby declare as follows:

3. We are actively involved in the research disclosed in, and are named as co-inventors of the above-identified application and its parent applications, and are therefore well aware of their contents.
4. We have reviewed the above-referenced application and the office action mailed January 23, 2003. We submit this declaration in connection with the office action. More specifically, we submit this declaration in connection with the claim rejections based on "Interspecies

Diversity of the Occludin Sequence: cDNA Cloning of Human, Mouse, Dog, and Rat-Kangaroo Homologues," Ando-Akatsuka et al., The Journal of Cell Biology, Vol. 133, No. 1, April 1996, pp. 43-47 (hereinafter referred to as the Ando-Akatsuka publication).

5. The publication date of the Ando-Akatsuka publication was April, 1996. The sequence of human occludin reported in the Ando-Akatsuka publication paper was also available on the Internet through the National Center for Biotechnology Information (NCBI) on February 1, 1996 under accession number U49184.
6. We isolated and sequenced the cDNA for human occludin and deduced its amino acid sequence at least as early as 1995, which is before the publication of the Ando-Akatsuka publication. Thus, we had possession of the currently pending claims before the earliest publication date of the Ando-Akatsuka publication.
6. 7. The attached documentation establishes that we isolated and sequenced the cDNA sequence for human occludin at least as early as 1995. This is shown on pages 23, 40, and 78 of Dr. Van Itallie's laboratory notebook, copies of which are attached hereto as Exhibit C. The notebook pages are dated prior to the earliest publication date of the Ando-Akatsuka publication, but the dates have been redacted to maintain the secrecy of the date of our invention.

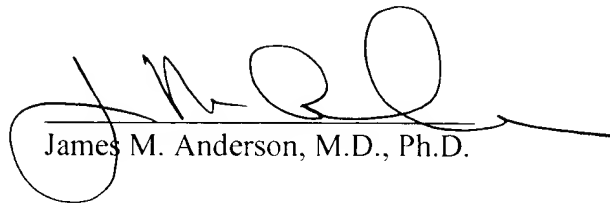
8. Page 23 of Dr. Van Itallie's laboratory notebook is entitled "Plasmid preps on 1, 5, 7 for sequencing, Northern, etc." Plasmids 1, 5, and 7 contained cDNA sequences of human occludin obtained by screening a human cDNA library. Lines 7 and 8 from the bottom refer to DNA sequencing reactions of clones 1 and 7, which were submitted to the Yale Sequencing Facility for automated sequencing.
9. Ja1OCT7 designates: James Anderson clone 1 of human occludin sequenced by priming the plasmid with the T7 primer (hereinafter "clone 1"). Ja7OCT7 designates: James Anderson clone 7 of human occludin as sequenced by priming the plasmid with the T7 primer (hereinafter "clone 7").
10. Clone 1 encodes the correct full-length human occludin. Clone 7 lacks sequence encoding the N'-terminal 32 amino acid residues. We submitted the sequence of clone 7 in Figure 2 of our U.S. Provisional Application. We recognized that clone 1 contained the correct N'-terminal sequence after release of NCBI-accession number U49184, as acknowledged at the top of page 78 in Dr. Van Itallie's notebook. Clone 1 overlaps clone 7 from amino acid residues 33 to 522 of SEQ. ID. NO. 2. Both clones 1 and 7 code for the extra-cellular loops of interest in the present application. The extra-cellular loops are residues 89 to 138 and residues 196 to 246 of SEQ. ID. NO. 2.

11. We were working with both clones 1 and 7 prior to the earliest publication date of the Ando-Akatsuka publication. By the filing date of our U.S. Provisional Application, we were using clone 7 in our continuing research.
12. Page 40 from Dr. Van Itallie's notebook is also dated prior to the earliest publication date of the Ando-Akatsuka reference. This page is entitled "Make full length ocl clone for expression". As noted, clones 1 and 7 differ at the 5' end of their coding regions. Clone 1 encodes the correct full length human occludin. At the time we simultaneously pursued the possibility that clone 7 might contain the correct 5' end. In the protocol described on page 40, Dr. Van Itallie is ligating the 5' end of clone 7 onto the 3' end of clone 1 at a shared Bgl II site and cloning them into a mammalian expression vector. Page 40 also shows this protocol continued on a later date.
13. We completely identified the sequence of human occludin as presently claimed prior to the earliest publication date of the Ando-Akatsuka publication. Thus, we invented the subject matter of the present application, as presently claimed, before it was described in the Ando-Akatsuka publication.
14. All statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true. These statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that

such willful false statements may jeopardize the validity of the above-referenced application  
or any patent issuing thereon.


Chapel Hill, NC, United States

Date: Oct 2, 2003



James M. Anderson, M.D., Ph.D.

Date: Oct 2, 2003



Christina M. Van Itallie, M.D.

**James M. Anderson, Ph.D., M.D.****Personal**

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 Chapel Hill, North Carolina 27599-7545  
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 E-mail Address: jandersn@med.unc.edu

**Present Position**

Professor and Chair  
 Department of Cell and Molecular Physiology  
 The University of North Carolina at Chapel Hill

**Education**

B.S.	Biology	Yale College, New Haven, CT	1974
Ph.D.	Biology	Harvard University	1979
M.D.		Harvard Medical School	1983
M.S.	Science	Yale University (honorary)	1998

**Clinical Experience**

Intern/Resident, Yale-New Haven Hospital, New Haven, CT	1983-86
Postdoctoral Fellowship, Hepatology, Yale School of Medicine, New Haven, CT	1986-89
Diplomat, American Board of Internal Medicine	1986 -
Connecticut State Medical License - 027065	1985 -
Attending Physician, Yale-New Haven Hospital	
Internal Medicine and Hepatology	1988 - 02
Attending Physician, West Haven Veteran's Administration Hospital	
Internal Medicine and Hepatology	1988 - 02

**Professional Experience**

Yale School of Medicine	
Assistant Professor of Internal Medicine	1988 - 91
Associate Professor of Internal Medicine and Cell Biology	1991 - 98
Associate Professor (without term)	1996 - 98
Chief, Section of Digestive Diseases	1996 - 02
Professor of Medicine and Cell Biology	1998 - 02
The University of North Carolina at Chapel Hill	
School of Medicine	
Professor and Chair, Cell and Molecular Physiology	2002 -

**Honors and Recognition**

Individual NRSA	1986 - 88
Terry Kirgo Memorial Fellowship, American Liver Foundation	1987 - 88
Lucille P. Markey Scholar Award in Biomedical Science	1988 - 94
The Dean's Young Faculty Award, Yale School of Medicine	1991

American Society for Clinical Investigation, elected member	1994 -
Interurban Clinical Club (Boston/NY/New Haven/Phili/Baltimore), elected member	1994 - 02
American Association of Physicians, elected member	1999 -

## Professional Affiliations

American Society for the Advancement of Science  
 American Association for the Study of Liver Diseases  
 American Association of Physicians  
 American Gastroenterological Association & Gastroenterology Research Group  
 American Physiological Society  
 American Society for Cell Biology  
 American Society for Clinical Investigation  
 Association of Subspecialty Professors  
 International Association for the Study of Liver Diseases

## Editorial Boards

<i>Gastroenterology</i>	1999 - 04
<i>Journal Clinical Gastroenterology</i>	1999 - 04
Ad Hoc Referee	

## Committees and Activities

### National Committees

Advisory Board Member	
Harvard Digestive Diseases Research Core Center - (NIH)	1996 -
University of Pennsylvania School of Medicine,	
Center for Studies of Digestive and Liver Diseases - (NIH)	1998 - 03
Research Committee, Am. Gastro. Assoc.	1992 - 96
Research Committee, Am. Assoc. Study Liver Diseases	1996 - 99
Selection Committee, Life Sciences Research Foundation (Princeton, NJ)	1996 - 97
NIH NIGMS Biomedical Research & Research Training Committee	
BRT-A Study Section	1996 - 00
FASEB Research Conference, GI Track VIII, Co-organizer,	2001
Experimental Biology 2001, Symposium Organizer	2001
Ph.D., DVM, MD/PhD Committee, Am Gastro Assoc	2001 - 03
Chair	2003 - 05
Organizer, Special Interest Subgroup Meeting, 14 Dec. 2002	
Annual Meeting of the Am Soc for Cell Biology, San Francisco, CA	2002
Association of Chairs of Departments of Physiology	2003-
Membership & Diversity Council, Am Gastro Assoc	2004-07

### Yale University

Biological Sciences Advisory Committee	1998 - 00
Tenure and Appointments Committee for the Biological Sciences	1998 - 00

### Yale Medical School

Co-Director, L.P. Markey Physician-Scientist Training Program	1991 - 96
M.D./Ph.D. [MSTP] Selection Committee	1990 - 02
Boyer Center Junior Faculty Program Selection Committee	1994 - 95
Anna Fuller Molecular Oncology Fellowship Selection Committee	1994 - 98
Advisory Board, Yale Critical Technologies Program	1995 - 97
Member, Yale Comprehensive Cancer Center	1995 - 02
Advisory Committee, Center for Cell Imaging - Cell Biology	1996 - 97



Internal Selection Committee, HHMI Investigator Nominees	1996 & 01
Search Committee, Chair of Cellular and Molecular Physiology Department	1998 - 99
Liver Transplantation Steering Committee	1996 - 02
New Research Building Space Allocation Committee	1998 - 02

**Yale Department of Internal Medicine**

Director, Research Pathway	1993 - 02
Residency Selection Committee	1990 - 02
Space Allocation Committee	1999 - 02
Search Committee, Chief of Medical Oncology	2000 - 01

**Yale Division of Digestive Diseases**

Chief	1996 - 02
Assoc. Director, Yale Liver Center - (NIH)	1998 - 02
Executive Committee, Yale Liver Center - (NIH)	1993 - 02
Director, Investigative Hepatology Training Grant - (T32, NIH)	1999 - 02

**UNC at Chapel Hill School of Medicine**

Basic Science Chairs Committee	2002-
Advisory Committee for the School of Medicine	2002-
Lineberger Comprehensive Cancer Center, Member	2002-
Gottschalk Award Nominating Committee	2002-
Scientific Misconduct Case Inquiry Team	2002
Medical-Scientist Training Program, Executive Committee	2002-
Cell & Molecular Biology Training Program (NIH-T32), Executive Committee,	2002-
Associate Director, Center for Gastrointestinal Biology and Disease (NIH-P30)	2003-
Interdisciplinary Biomedical Sciences Graduate Program, Committee Member	2002-
Faculty Salary Equity Committee	2003-

**UNC Department of Cell & Molecular Biology**

Graduate Committee (Cell & Molecular Physiology), co-Chair	2002-
Faculty Recruitment Committee, Chair	2002-
Director, Weekly Seminar Series	2002-
Research Day, Director	2002-

**Postdoctoral Trainees****Yale School of Medicine**

		<u>Present Position</u>
Elizabeth Willott, Ph.D.	1988 - 90	Research Faculty, Univ. Arizona
Michael Fallon, M.D.	1989 - 93	Prof. of Medicine, Univ. Alabama - Birmingham
Maria Susana Balda, Ph.D.	1990 - 94	Research Faculty, Univ. London
Barry Slitzky, M.D.	1990 - 92	
David Rimm, M.D., Ph.D.	1990 - 91	Assoc. Prof. of Pathology, Yale
Stuart Levin, M.D.	1992 - 94	
Alan S. Fanning, Ph.D.	1993 - 96	Research Faculty, Yale University
Lynne Lapierre, Ph.D.	1994 - 97	Research Faculty, Cell Biology, Vanderbilt
Zenta Walther, M.D., Ph.D.	1997 - 02	Asst. Prof. of Pathology, YSM
Christoph Rahner, M.D.	1998 - 01	Asst. Prof. Surgery, Yale University
Rolando Medina, Ph.D.	1999 - 00	Biotech Patent Lawyer
Laura Mitic, Ph.D.	2000 - 02	Postdoctoral Associate, UCSF

**Graduate Students****Yale University**

Alexander Brecher, BS	1994 - 99	Dermatology Resident, New York University
MSTP/Cell Biology		
Laura Mitic, BS	1996 - 00	Postdoctoral Associate, UCSF

Cell Biology		
Danette Daniels, BS	1995 - 99	Postdoctoral Associate, Stanford University
Co-advisor (Alex Brunger)		
Molecular Biology & Biophysics		
Oscar Colegio, BS	2000 -	MSTP/Cell Biology

### Invited Research Speaker (selected)

Invited Plenary Speaker, Int. Union of Physiol. Sci., Glasgow, Scotland, 3 Aug. 1993  
L.P. Markey Trust Symposium, San Diego, CA, Sept. 1993  
SU New York Stony Brook MSTP Program, 11 May 1994  
Medical College of GA, Inst. of Molecular Medicine, May 1994  
Developmental Biology Center, UC Irvine, 13 June 1994  
R.W. Johnson Medical School, Cell and Dev. Biol., New Jersey, Feb. 1995  
University Speaker, Leicester, England, 4 April 1995  
Germany GI Society, State of the Art, Berlin, 16 Sept. 1995  
Iberoamerican Soc. Cell Biol., Mexico City, 7 Oct. 1995  
Keystone Symposium, Intercellular Junctions, March 1996  
Boehringer Ingelheim Fonds International Conference, Titisee, Germany  
State-of-the-Art, "Cell Junctions and Disease," Oct. 1996  
University of Colorado, Denver, Physiology Dept., Nov. 21, 1996  
Harvard Medical School, MGH Gastroenterology Section, Boston, MA, Feb. 25, 1997  
Invited Speaker, Falk Symposium, Freiburg, Germany, 1 Oct. 1997  
Invited Plenary Speaker, American Society Nephrology, San Antonio, TX, 4 Nov. 1997  
Symposium Speaker, MGH/Harvard, Mucosal Immunology, Boston, MA, 11 Nov. 1997  
Invited Speaker, Center for the Study of Basic Mechanisms of Inflammatory Bowel Disease,  
MGH/Harvard, Nov. 14-15, 1997  
Biochemistry Department, UT San Antonio, 6 March 1998  
3rd Intl. Malpighi Symposium, Monterey, CA, April 1998  
Invited Plenary Speaker, Annual FASEB Meeting, Washington, DC, April 1998  
Symposium Speaker, AGA/Digestive Disease Week, New Orleans, LA, 19 May 1998  
Medical Grand Rounds, Hospital of St. Raphael's, New Haven, CT, 2 June 1998  
Invited Speaker, Falk Symposium, Titisee, Germany, 17 Oct. 1998  
GI Grand Rounds, MGH/Harvard Medical School, 2 Feb. 1999  
FASEB, GI Tract, Copper Mt., 25-30 July 1999  
Physiology Dept. University of Texas Southwestern, Sept. 27, 1999  
ASCB MAGUK Symposium, Washington, DC, 11 Dec. 1999  
Keystone Symposium Chair, Mucosal Immunity, Taos, NM, 18-22 Jan. 2000  
Keystone Symposium, Intercellular Junctions, Feb. 2000  
Soc. Pediatric Pathology, New Orleans, LA, 25 Mar. 2000  
Yale Cell Biology Department Retreat, 7 April 2000  
Research Lecture, Jichi Medical School, Utsunomiya, Japan, 7 Sept. 2000  
4th US-Japan GI Meeting Program, Tokyo, Japan, 8 Sept. 2000  
Asahikawa GI and Hepatology Symposium, Asahikawa Medical College, Otaru, Japan, 10 Sept. 2000  
GI Symposium, Kyoto Medical School, Kyoto, Japan, 12 Sept. 2000  
10th Annual Arias Symposium, American Liver Foundation, Boston, MA, 25 Oct. 2000  
Medicine Department, Mt. Sinai School of Medicine, 16 Jan. 2001  
Experimental Biology 2001 - Symposium Chair, Tight Junction: Convergence of Molecular and Physiologic  
Insights, Orlando, FL, 1 April 2001  
Gordon Research Conference - Cell Contact, Andover, NH, June 2001  
AstraZeneca - Mucosal Defense Mechanisms, Gothenburg, Sweden, June 2001  
FASEB Research Conference, GI Track VIII (co-organizer), August 2001  
Cell & Molecular Physiology Dept., UNC-Chapel Hill, 25 Sept. 2001  
Yale Pathology Department Grand Rounds, 18 Oct. 2001  
Canadian Gastroenterology Society, Montreal, 3 Feb. 2002

MD-PhD Retreat, UNC at Chapel Hill, Wilmington NC, 3 Aug. 2002  
European Intestinal Transport Group, Egmond aan Zee, NL, 28 Sept. 2002  
Dept. of Physiology, Northwestern School of Medicine, Chicago, IL, 10 Oct. 2002  
Dept. of Cell Biology, UNC, Chapel Hill, 23 Oct. 2002.  
Am. Soc. for Nephrology. Ann. Meeting, symposium speaker, 3 Nov. 2002  
Dept. of Pharmacology, UNC-Chapel Hill, Chapel Hill, NC, 3 Dec. 2002  
USC School of Medicine, Pulmonary Division, 13 Dec. 2002  
Co-organizer, ASCB meeting on Tight Junction, San Francisco, CA 14 Dec. 2002  
NIH-NIEHS, Chapel Hill, NC, 8 Jan. 2003  
Transatlantic Airway Conference, Key Biscayne, FL, 15 Jan. 2003  
Annual Higuchi Research Seminar, Univ. Kansas Pharmaceutical Chemistry, 4 May 2003

## Scientific Advisory Boards

Scientific Advisory Board, WEST Pharmaceutical Services, Lionville, PA, 1994 - present  
GI Transport Advisory Board, ALZA Corporation (J&J), Mountainview, CA, 2000  
Scientific Advisory Board, Nastech, Seattle, WA, 2003-present

## Extramural Grants

### Ongoing Research Support

RO1 DK 45134 Anderson (PI)	04/01/03 – 03/31/08
NIH/NIDDK	
<i>Molecular Analysis of Tight Junctions in Liver and Gut.</i>	
The goal of this grant is to understand the molecular basis for control of paracellular transport in normal and diseased epithelia with the long-term goal of manipulating these properties for therapeutic purposes.	
Role: PI	
PO1 DK055389 Morrow (PI)	12/01/98 - 11/30/03
NIH/NIDDK	
<i>Cell and Molecular Pathobiology of Renal Disease.</i>	
The overall goals of this project are to understand epithelial cell organization including membrane trafficking, myosin motor and angiogenesis in the kidney and in response to injury. Subproject 4 focuses on the response of tight junctions to reversible ischemia.	
Role: PI on Subproject 4	
RO1 DK Anderson (PI)	04/01/03 – 03/31/08
NIH/NIDDK	
<i>ZO-1 and cytoplasmic scaffolding at the tight junction.</i>	

### Completed Funding (last 3 years)

P30 DK34989 Boyer (PI)	07/01/99 - 06/30/04
NIH/NIDDK	
<i>Digestive Diseases Research Core - Yale Liver Center</i>	
Role: Associate Director of Center and Director of the Molecular Biology Core	
T32 DK07356 Anderson (PI)	07/01/99 - 06/30/04
NIH/NIDDK	
<i>Investigative Training in Hepatology</i>	
Role: Director	
PO1 CA66263 Bryant (PI, UC Irvine)	07/01/95 - 06/30/00

James M. Anderson, Ph.D., M.D.

NCI

*Membrane Associated Guanylate Kinase Homologs*

The goals of this grant are to study a class of proteins called MAGUKs, which are important in organizing membrane domains. A range of methods are used including genetics (*Drosophila*, *C. elegans* and mice), Cell Biology and x-ray crystallography to define the protein structure, interactions and function. Project 4 is focused on the mammalian MAGUKs CASK, hDlg and ZO-1. Much of the work focused on the biology of PDZ domains and work on ZO-1 is focused on its intramolecular domain interactions and how these regulate binding to other proteins.

Role: PI on Subproject 4

## Bibliography

### Original Peer-Reviewed Articles:

1. Anderson, J.M., Kleinhaus, A., Manuelides, L. and J.W. Prichard. 1974. Beveled dual-channel microelectrodes. *Biochem Eng BME* **21**:482-485.
2. Anderson, J.M. 1979. Structural studies on human spectrin. *J Biol Chem* **254**:939-944.
3. Anderson, J.M. 1979. Proteolytic fragmentation of spectrin: Effect of removal of terminal phosphopeptides on spectrin binding to human erythrocyte membrane. In: Normal and abnormal red blood cell membranes. Eds. S.E. Lux, V.T. Marchesi, C.F. Fox, Allan Liss Inc. New York, pp. 531-534.
4. Anderson, J.M. and J.M. Tyler. 1980. State of spectrin phosphorylation does not affect erythrocyte shape or spectrin binding to erythrocyte membranes. *J Biol Chem* **255**:1259-1265.
5. Tyler, J.M., Anderson, J.M. and D. Branton. 1980. Structural studies on several actin-binding macromolecules. *J Cell Biol* **85**:489-495.
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11. Stevenson, B.R., Anderson, J.M., Braun, I.D. and M.S. Mooseker. 1989. Phosphorylation of the tight junction protein ZO-1 in two strains of MDCK cells which differ in transepithelial resistance. *Biochem J* **263**:597-599.
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14. Schnabel, E., Anderson, J.M. and M.G. Farquhar. 1990. The tight junction protein ZO-1 is concentrated along slit diaphragms of the glomerular epithelium. *J Cell Biol* **111**:1255-1264.
15. Watson, P.M., Anderson, J.M., Van Itallie, C.M., and S.R. Doctrow. 1991. The tight junction-specific protein ZO-1 is a component of the human and rat blood-brain barrier. *Neuroscience Letter* **129**:6-10.

16. Byers, S.W., Citi, S., Anderson, J.M., and B. Hoxter. 1992. Polarized functions and permeability properties of rat epididymal epithelial cells in vitro. *J Reproduction & Fertility* **95**(2):385-396.
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19. Kurihara, H., Anderson, J.M., and M. Farquhar. 1992. Diversity among tight junctions in the rat kidney: The glomerular slit diaphragms and endothelial junctions express one not both isoforms of the tight junction protein ZO-1. *Proc Natl Acad Sci, USA* **89**:7075-7079.
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27. Van Itallie, C.M. and J.M. Anderson. 2003. The Role of Claudins in Determining Paracellular Charge Selectivity. *Am. J. Respiratory and Critical Care Medicine*. (in press)

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**Professional Experience**

1975-77 Research Assistant for Drs. Sanford L. Palay and Victoria Chan Palay Departments of Anatomy and Neurobiology, Harvard Medical School.  
 1977-78 Graduate Student (Master's degree) at Columbia University's Institute of Human Nutrition.  
 1978-83 Graduate Student with Dr. J.D. Fernstrom, Division of Neural and Endocrine Regulation, Dept. of Nutrition and Food Science, MIT .  
 Dissertation: "Regulation of Hypothalamic Somatostatin Biosynthesis"  
 1983-86 Post-doctoral Fellow with Dr. P.S. Dannies, Pharmacology, Yale School of Medicine  
 1986-88 Associate Research Scientist, Pharmacology, Yale School of Medicine  
 1988-94 Assistant Professor, Internal Medicine, Yale School of Medicine  
 1994 -02 Research Scientist, Internal Medicine, Yale School of Medicine  
 2002- Associate Professor, Department of Internal Medicine, UNC-Chapel Hill

**Honors and Recognition**

1981-83 Recipient of Individual Pre-doctoral Fellowship Award from NIMH  
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 1987-88 Recipient of Argall and Anna L. Hull Cancer Research Award

**Professional Affiliations**

American Society for the Advancement of Science

## **Extramural Grants**

### **Ongoing Research Support**

RO1 DK 45134 Anderson (PI) 04/01/03 – 03/31//08

NIH/NIDDK

Molecular Analysis of Tight Junctions in Liver and Gut.

The goal of this grant is to understand the molecular basis for control of paracellular transport in normal and diseased epithelia with the long-term goal of manipulating these properties for therapeutic purposes.

Role: Co-investigator

PO1 DK055389 Morrow (PI) 12/01/98 - 11/30/03

NIH/NIDDK

Cell and Molecular Pathobiology of Renal Disease.

The overall goals of this project are to understand epithelial cell organization including membrane trafficking, myosin motor and angiogenesis in the kidney and in response to injury. Subproject 4 focuses on the response of tight junctions to reversible ischemia.

Role: PI on Subproject 4

RO1 DK Anderson (PI) 04/01/03 – 03/31/08

NIH/NIDDK

ZO-1 and cytoplasmic scaffolding at the tight junction.

### **Completed Funding (last 5 years)**

P30 DK34989 Boyer (PI) 07/01/99 - 06/30/04

NIH/NIDDK

Digestive Diseases Research Core - Yale Liver Center

Role: Director of Cell Isolation and Culture Core

PO1 CA66263 Bryant (PI, UC Irvine) 07/01/95 - 06/30/00

NCI

Membrane Associated Guanylate Kinase Homologs

The goals of this grant are to study a class of proteins called MAGUKs, which are important in organizing membrane domains. A range of methods are used including genetics (*Drosophila*, *C. elegans* and mice), Cell Biology and x-ray crystallography to define the protein structure, interactions and function. Project 4 is focused on the mammalian MAGUKs CASK, hDlg and ZO-1. Much of the work focused on the biology of PDZ domains and work on ZO-1 is focused on its intramolecular domain interactions and how these regulate binding to other proteins.

Role: Scientist on Subproject 4

RO1 DK 45134 Anderson (PI) 07/01/98 – 06/30/02

NIH/NIDDK

Molecular Analysis of Tight Junctions in Liver and Gut.

The goal of this grant is to understand the molecular basis for control of paracellular transport in normal and diseased epithelia with the long-term goal of manipulating these properties for therapeutic purposes.

Role: co-PI

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- Van Itallie, C.M. and T.B. Friedman. 2003. Claudin 14 knockout mice, a model for autosomal recessive deafness DFNB29, are deaf due to cochlear hair cell degeneration. *Human Mol Gen* (in press).

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Plasmid prep of 1, 5, 7 for sequencing, Northern etc

OD 5  $\mu$ l / 1000  $\mu$ l

	260	280		
#1	0.320	0.173	18	2.56 $\mu$ g/ $\mu$ l
5	0.496	0.276	18	7.0 $\mu$ g/ $\mu$ l
7	0.328	0.189	17	2.6 $\mu$ g/ $\mu$ l

set up digests - dig (for seq) more for insert prep

#1, 5, 7 1  $\mu$ l plasmid  
9  $\mu$ l mix

mix - 4  $\mu$ l 10x R1 buffer  
0.4  $\mu$ l BSA  
3  $\mu$ l R1  
28.6  $\mu$ l H<sub>2</sub>O

also - 20  $\mu$ l for insert prep

#1 8  $\mu$ l plasmid  
10  $\mu$ l 10x enzyme  
1  $\mu$ l BSA  
3  $\mu$ l Eco R1  
78  $\mu$ l H<sub>2</sub>O

#2 8  $\mu$ l plasmid  
10  $\mu$ l 10x buffer  
1  $\mu$ l BSA  
3  $\mu$ l Bam HI  
3  $\mu$ l Hinc II  
75  $\mu$ l H<sub>2</sub>O

#5 5  $\mu$ l plasmid  
10  $\mu$ l 10x buffer  
1  $\mu$ l BSA  
3  $\mu$ l Hinc II  
81  $\mu$ l H<sub>2</sub>O

taken over for sequencing

#5 - T8, T9

#1 - 18684 (132  $\mu$ M) 18686

#2 - 18689, 18685

18689 - ampicillin resistance #2

18685 - sense 348-365 70CT7

18686 - 344-361 J210CT7

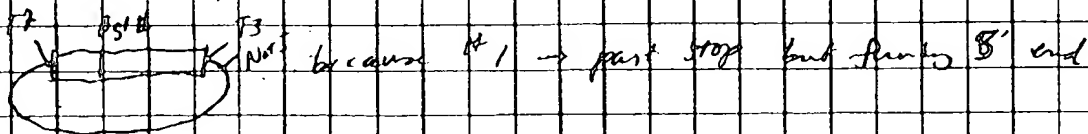
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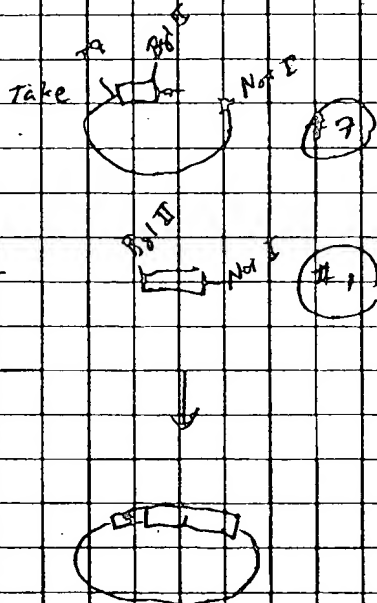
Make full length rec clone for expression

Plan cut clone I, 7 w Bgl II, Not I

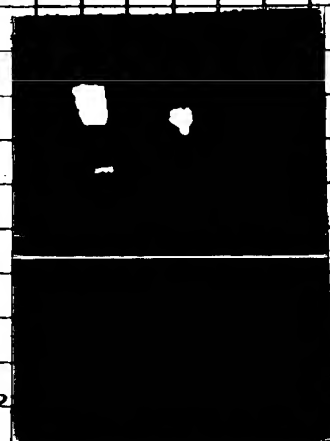
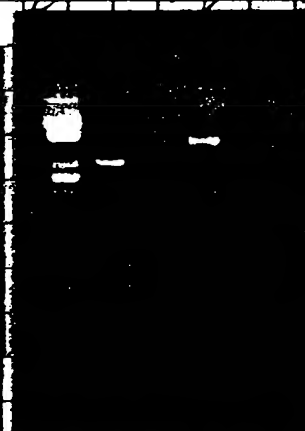
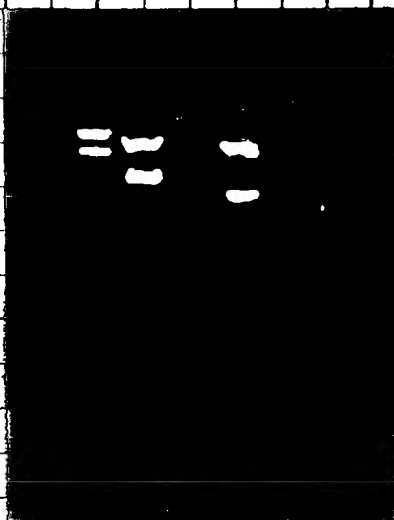


clone 1 2.6 ug/pl  
7

cut 10 ug of clone #7  
20 ug of clone #1



#7	1
cut ✓ 4 µl plasmid	✓ 8 µl plasmid
10 µl rx 3	10 µl 10 ligation 3
✓ 1 µl BSA	✓ 1 µl BSA
2 µl Bgl II	2 µl Bgl II
2 µl Not I	2 µl Not I
✓ 81 µl H <sub>2</sub> O	✓ 77 µl H <sub>2</sub> O



Gene clean #1, 7 - run 1 µl (out of 10) on gel  
 re-analyzed - #1 - insert looks good  
 #2 - small amplicon high cut?  
 double band at around 9 kb - 0.9 kb  
 recut #7 w Not I/  
 Not I/Bgl II  
 Bgl II

a.v. #2  
 ① 4 µl plasmid  
 ②  
 ③  
 old prep  
 ④

Revelation! human occlusin sequence published and have been working w/ strong clone - clone #1 is correct so put it into pCBG vector (Kpn/Xba)

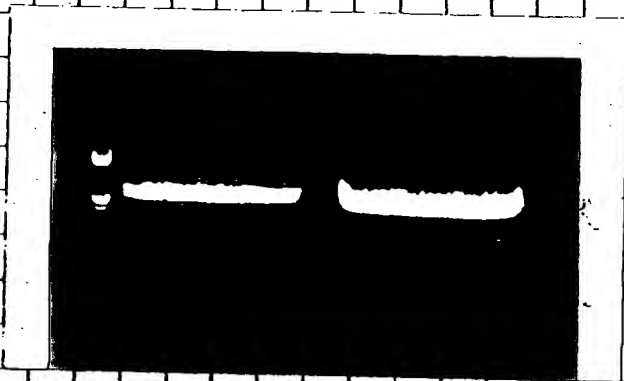
cut clone #1 w/ Kpn  
 - 10 µl #1  
 10 µl 10x buffer #1  
 10 µl BSA  
 3 µl enzyme  
 67 µl H<sub>2</sub>O

cut pCBG w/ Xba I  
 clone #21 w/ Spe I  
 Start at 12:58 PM - 2:30  
 run on 1% gel for gene clean

Kpn I/Spe I insert is 2.45  
 plasmid is 2.9  
 pCBG - 6.2

} run for 60' at 120V 2:30-3:30

gene clean



Post run -  
 2 µl gene  
 2 µl 10x  
 2 µl Pvu  
 14 µl H<sub>2</sub>O  
 3' 35°C  
 20' 65°C  
 take 2 µl  
 #2, 3

ligation

①	③	③	②	
3 µl insert	3 µl insert	3 µl insert	1 µl insert	Transform
1 µl vector	2 µl Pvu vector	2 µl Pvu vector	2 µl 10x lig	1 µl Li
2 µl 10x lig	2 µl 10x lig	2 µl 10x lig	2 µl 10x lig	100 µl cell
1 µl ligase	1 µl ligase	1 µl ligase	1 µl ligase	30' 10
17 µl H <sub>2</sub> O	13 µl H <sub>2</sub> O	16 µl H <sub>2</sub> O	16 µl H <sub>2</sub> O	

FROM: ADMIN

NO. 994

CELL & MOLECULAR PHYSIOLOGY

MAY 14, 2003 4:11 PM

J.C.